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On the Size and Number of Regional Integration Arrangements

A Political Economy Model

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Left alone, the current wave of regional trade agreements will probably not lead to global free trade. Vigorous multilateral trade agreements — encouraging open membership policies and the lowering of external tariffs when internal tariffs are removed — are essential to fully liberalizing the global trading system.

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Summary findings

Will the current wave of regional integration arrangements lead to the world being divided into competing inward-looking trading blocs? Or will it lead to a more open multilateral trading system? Using a multicountry political economy model, and after having shown that global free trade is optimal, Andriamananjara investigates the possibility of achieving it through regionalism.

An outsider country considering entering a trading bloc must weigh *the tradeoff between the costs of opening its own market to more foreign competition and the gains from getting better access to the bloc's preferential market.* The gain of access is always larger, so an outsider would always want to apply for membership in the existing bloc. If the bloc policy is open membership, its expansion would result in global free trade.

But if member countries can accept or reject new members, expansion of the bloc is unlikely to yield global free trade. When deciding whether to accept or reject a new member, an insider compares *the gains from getting preferential access to the new member's market with the losses from having to share its original preferential market with the new member.* When the bloc is small, the gains are large enough to offset the losses, so insiders are willing to accept new members. As the bloc expands, the insiders' incentive for expanding decreases, eventually to zero. If only one regional integration arrangement were allowed to form, insiders would stop accepting new members when half the world belonged to the bloc.

The remaining outsiders would probably form a bloc of their own, which would lead members of the original bloc to increase its size in anticipation of the creation of the second bloc. *The threat of regionalism by outsiders would foster larger regional integration arrangements.* In this model, the typical subgame perfect equilibrium would be two blocs, one of them containing roughly two-thirds of the world, the other containing roughly one-third.

Even if blocs form and merge *simultaneously,* yielding progressively larger symmetrical blocs, they would fail to converge in a single bloc unless the external tariff were low enough. In other words, global free trade could be achieved through bloc expansion *if trading blocs lowered their external tariffs when abolishing their internal tariffs.*

This paper — a product of Trade, Development Research Group — is part of a larger effort in the group to examine the economics of regionalism and development. Copies of the paper are available free from the World Bank, 1818 H Street NW, Washington, DC 20433. Please contact Lili Tabada, room MC3-333, telephone 202-473-6896, fax 202-522-1159, Internet address ltabada@worldbank.org. Policy Research Working Papers are also posted on the Web at http://www.worldbank.org/html/dec/Publications/Workpapers/home.html. The author may be contacted at soamiely@wam.umd.edu. May 1999. (37 pages)

ON THE SIZE AND NUMBER OF REGIONAL INTEGRATION ARRANGEMENTS: A POLITICAL ECONOMY MODEL[°]

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Non-Technical Summary

The last two decades have seen a rapid proliferation of Regional Integration Arrangements (RIAs). Concurrently, regionalism has re-emerged as a major trade policy issue in many developing countries. Due to their discriminatory nature, RIAs can be welfare reducing for the excluded countries, for the world as a whole, and even for the member countries as they divert resources away from their most efficient uses. This would even be worse if the world became divided into a number of competing trading blocs.

It is then perfectly legitimate for both economists and policymakers to worry about the effects of this recent trend on the global trading system. Is the current wave of regionalism going to lead to a division of the world into a number of competing inward-looking blocs? Or is it going to lead to a more open multilateral trading system? This paper addresses these issues using a multi-country political economy model. Having established at the outset that global free trade is optimal and that it is initially feasible as a one-shot game, the paper investigates the possibility of achieving it through the regionalism approach. The goal is to determine the likely equilibrium size and number of RIAs.

The paper first looks at the case where countries move sequentially (i.e., one by one). It studies in some detail the incentives for RIA expansion by looking at both the non-members' desire to join the bloc or start forming their own bloc and the members' incentives to accept new members. For an outsider country contemplating entry to a trading bloc, the choice is determined by *the trade-off between the costs of opening up one's own market to more foreign competition, on the one hand, and the gains from obtaining better access to the bloc's preferential market on the other hand.* It is shown that the latter part (the access gain) is always larger, so that an outsider would always want to apply for membership to the existing bloc. Hence, if the bloc had open membership policy, its expansion would result in global free trade.

At the other end of the table, if member countries can choose to accept or reject new members (i.e., if membership were selective), the expansion of the bloc is not likely to yield global free trade. When deciding whether to accept or reject a new member, an insider compares *the gains from getting preferential access to the new member's market, on the one hand, with the losses for having to share its original preferential market with the new member on the other hand.* At small bloc size, the gains are large enough to offset the losses so that the insiders are willing to accept new members. As the bloc expands, however, the insider's incentives for further bloc expansion decrease and eventually go to zero. If only one RIA were allowed to form, then the insiders would stop accepting new members when the bloc contains about half the world.

But what happen to the remaining outsiders? Instead of passively taking the abuse of the existing bloc members, the rejected countries are likely to form a bloc of their own. It is shown that the possibility of a second bloc would lead the members of the original bloc to choose a bloc size which is larger than if only one bloc was allowed to exist. Hence, *the threat of regionalism by outsiders would foster larger RIAs*. In this model, the typical subgame perfect equilibrium is two blocs with the first one consisting of about two-thirds of the world while the second one about one-third.

Next, an alternative and relatively novel process is examined whereby blocs form and merge simultaneously to yield progressively larger symmetric blocs. Will this continue so as to yield one single bloc, which is global free trade? The paper shows that even in this simultaneous bloc expansion, the process fails to converge to a single bloc except when the external tariff happens to be low enough. Here, we have an example of open regionalism, based on low external tariffs, leading to multilateral free trade. One direct policy implication of this is that global free trade can be achieved through bloc expansion if trading blocs lower their external tariffs when they abolish their internal tariffs.

The key lesson to take away from this paper is that there is a real possibility that, left on its own, the current wave of regionalism will not lead to global free trade. Additional rules of the game (preferably in the context of the WTO) are required in order to reach this goal: (i) Allow only the formation of trading blocs that have open membership policy and/or (ii) Allow only trading blocs that substantially lower their external tariffs when they eliminate internal tariffs. As the practicality of these propositions is not evident, vigorous multilateral efforts in trade liberalization are meanwhile needed to achieve a more liberal global trading system.

1. Introduction

The recent proliferation of Regional Integration Arrangements (RIAs) has raised the question whether the arrangements will serve as building blocks or stumbling blocks to global free trade. In the present paper, I explore this important issue by focusing on two key questions. First, in an incentive-theoretic setting, can an RIA continue to expand until it encompasses the entire world? And second, if two or more trading blocs form simultaneously, do they have an incentive to merge so that eventually the world turns into a single global bloc?

The formation and the expansion of a trading bloc require a "coincidence of wants" among all the interested parties. On one hand, the outsiders must want to join the bloc while, on the other, the insiders have to be willing to accept new members. Assuming that blocs form sequentially, my first objective is to formulate the incentives of both the RIA members and the non-members to form, join or expand a trading bloc and to determine the equilibrium membership size and the equilibrium number of RIAs. My second objective is to study a situation where blocs form simultaneously in the incentive-theoretic setting and to explore whether the blocs merge into ever-enlarging blocs such that we are left with a single bloc at the end of the process.

Though the literature on the building versus stumbling blocks issue has been growing rapidly, it is still in its infancy. The existing contributions can be divided into two categories. In the first category, which may be called the "endogenous protection" category, we have papers that ask

whether the formation of an RIA leads to a higher or lower protection with respect to the outside countries. Papers by Richardson (1993), Panagariya and Findlay (1996), Bagwell and Staiger (1997), Krishna (1998), and Levy (1997a, 1997b) fall in this category. In the second category, which can be termed the "endogenous expansion" category, we have papers whose focus is on the expansion of blocs. Papers by Baldwin (1995), Yi (1996) and Bond and Syropoulos (1996) belong to this category. Since the present paper falls into the second category, it is useful to summarize this set of papers.[1]

Using a political economy model à la Grossman and Helpman (1995), Baldwin (1995) shows that the expansion of an RIA increases the incentives of the outsiders to apply for membership. One direct implication of his result is that if membership was open, and if non-economic factors against seeking entry were absent, regionalism would lead to global free trade. Baldwin's model is insightful but it tells only a part of the story since it fails to consider the incentives of the current members to keep new members out of the arrangement.

Using analytical techniques from the non-cooperative theories of stable coalition structure, Yi (1996) studies stable customs-union (CU) where the CUs are formed based on the traditional, welfare-maximizing, optimal tariffs criterion.[2] He shows that the formation of a CU increases

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[1] Bhagwati and Panagariya (1996) and Winters (1996) provide excellent surveys of the literature on this subject.

[2] Yi's rich model uses sophisticated and abstract rules of customs-union formation: Each country announces an 'address' and the countries that announce the same address belong in the same customs union. In the sequential-move version, the first country makes an address announcement. After observing the first announcement, the second country announces its

the aggregate welfare of the members but reduces the welfare of non-members. Like Baldwin, Yi finds that CUs are a stepping stone toward global free trade provided the membership is open to all countries. But it turns out in his model that under "unanimous-membership" rule, according to which a CU allows entry of a new member if and only if all existing members agree to admit the new member, regionalism can be a stumbling block to global free trade.

Bond and Syropoulos (1996) explore the relationship between the size of trading blocs, the market power of trading blocs (as captured by the level of their optimal tariffs) and world welfare within a differentiated-goods model similar to that in Krugman (1991). They show that a large increase in the relative size of a bloc enhances its relative market power and causes the welfare of its country members to rise above the free trade level. If bloc expansion is driven by welfare maximization, blocs will fail to expand into a single global bloc in their model.

In the present paper, I present a multi-country, Cournot-oligopoly model in which the bloc-expansion and merger issues can be readily analyzed. Because the model permits the analysis within a homogeneous-good model, it retains simplicity despite the presence of multilateral trade. A key feature distinguishing the analysis from Yi or Bond and Syropoulos is the role it assigns to producer interests in the determination of the outcomes. The political economy framework used is a stripped-down multi-country version of Grossman and Helpman (1995) and is therefore more closely related to Baldwin's approach in that the incentives of trading

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preferred address, and so on. In the simultaneous-move version, countries announce addresses at the same time.

blocs to expand or to merge are determined through a political process dominated by producers rather than through welfare considerations as is more common in the literature.

Another distinguishing feature of the paper is that I omit market power or optimal tariffs considerations (which are important aspects of Bond and Syropoulos and, to a lesser extent, Yi) and take the external tariffs of trading blocs as exogenously fixed. This feature is more realistic because blocs' external tariffs are in the real world bound by GATT's Article XXIV.[3] It also allows to separate the direct effects of intra-bloc trade liberalization from the effects of the expanding bloc's increased market power (as captured by higher optimal tariffs).[4] Given the second best nature of regionalism, the direct effects of intra-bloc liberalization are not always unambiguous. Furthermore, I consider the issue of merger of blocs, which has been largely neglected in the literature to date.

In Section 2, I introduce the notations and the structure of a basic model which could be thought of as a multi-country version of Krishna (1998)'s three country model.[5] At the outset, I

[3] There are other reasons for abstracting from optimal tariffs. First, countries, in practice, rarely choose their tariffs for optimal tariff reasons. Also, optimal tariffs derived in economic models have been shown to be much too high compared to the actual observed levels (Krugman, 1991).

[4] Krugman (1993) disaggregates the welfare effects of regionalism and finds that the welfare losses due to bloc expansion owe far more to trade diversion than to increases in the optimum external tariff.

[5] In his three-country model, Krishna (1998) shows that the more trade diverting an FTA between two countries, the more domestic support it will get. He then demonstrates that the formation of the two-country FTA reduces the members' incentives for multilateral liberalization with the third country. As interesting as it may seem, this result appears to be mainly driven by the terminal condition which implies that, since no more trade diversion is

establish that, from a world welfare perspective, global free trade is optimal if non-negative tariffs are the only available policy instruments. However, the paper shows that even though it is initially feasible as a one-shot game, global free trade may become unfeasible if some groups of countries take the regionalism path.

In Section 3, I consider the case where countries move sequentially and show that, in this case, only one trading bloc will form and expand at any given time.[6] The key finding in this sequential bloc expansion process is that, though outsiders always want to join, at some point the incentive of the member countries to take new members declines to zero before all countries have been admitted. This fact leads to the formation of a second bloc but in the absence of inter-bloc cooperation to merge, the process cannot lead to the multilateral outcome. Another important result and contribution is that the anticipation of a second RIA being created leads the members of the original group (which act as a Stackelberg leader) to choose a group size larger than the one they would have chosen if only one bloc was allowed to form. Two trading blocs with one containing about two-thirds of the world and the other one-third will in general be the resulting pattern of world trade.

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possible by associating with the *last* non-member country, the member countries would have no incentive to admit it in their FTA. In order to get the full flavor of Krishna's results, one has to use more than three countries.

[6] Starting from a symmetric equilibrium and to capture the change in "relative bloc size", Bond and Syropoulos (1996) uses a different type of asymmetric bloc expansion in which one bloc expands by drawing members symmetrically from each of the other blocs. While this approach seems to serve its purpose, one obvious drawback is that if we start from an initial equilibrium where there is no bloc (or each country is a bloc itself), then the expansion of one bloc directly yields global free trade. Hence, the whole exercise is reduced to the feasibility of multilateral trade liberalization.

In Section 4, an alternative and relatively novel process is considered whereby blocs form and merge simultaneously to yield progressively larger blocs. I determine the stable number and size of the resulting blocs via this process. In this simultaneous bloc expansion, the process fails to converge to a single bloc except when the external tariff happens to be very low. Thus, here we have an example of open regionalism, based on low external tariffs, leading to multilateral free trade. Section 5 concludes.

2. The Basic Model

Consider a world with g similar countries. To economize on notation, I assume that there is only one firm in each country. All the firms in the world produce goods that are perfect substitutes for each other. To simplify the discussion, I introduce the notation first. Let i and j $(= 1, 2, ..., g)$ be country indices:

q_j^i : quantity supplied by firm from i to j's market;

P_j : equilibrium price of the good in j's market;

π_j^i : profits made by firm from i in j's market;

t_j^i : specific tariff imposed by country j on imports from i;

c : constant marginal and average costs of production.

The Demand Side

The aggregate utility in country j is assumed to have a quasi-linear form: $U_j(K,Q_j) = K + (AQ_j - Q_j^2/2)$, where $Q_j = \sum_{i=1}^{g} q_j^i$ is the total sales of the good in country j's market, and K is the consumption of a competitively produced numeraire good, which is assumed to be freely traded to settle the balance of trade. Hence, the price of the good in country j can be written as a linear function of the total sales in that country: $P_j = A - Q_j$.

The Supply Side

Uniform non-discriminatory *specific tariffs* are imposed by all countries on imports from other countries that do not have a special arrangement with them. The specific tariffs simply add on to the marginal costs of firms, whose effective marginal costs of exports then become $c + t_j^i$. As in Brander and Krugman's (1983) reciprocal dumping model, the markets in the different countries are perfectly segmented so that each firm regards each country as a separate market and chooses its optimal quantity for each country separately. Welfare gains from trade come from the increased competition that trade introduces. I assume that firms do not incur any transportation cost in exporting the good. In each market, firms act as Cournot players and maximize their profits taking other firms' output as given, and all the g firms are choosing their quantities simultaneously. Country i's firm, when choosing the quantity that it would export to country j, solves the following problem:

$$\max_{q_j^i} \quad q_j^i[A - Q_j - (c + t_j^i)],$$

which yields the Nash equilibrium output level:

$$q_j^i = \frac{(A-c)}{1+g} + \frac{\sum_{k=1}^{g} t_j^k}{1+g} - t_j^i.$$

The values of A, c, g, and t_j^i will be restricted in such a way that no firm will produce negative amount. Formally, this restriction, which will be referred to throughout the paper (under the expression "valid parameters"), is written as:

$$(A\text{-}c) \geq g.\, t_j^i.$$

The total consumption in country j is therefore given by:

$$(1) \qquad Q_j = \frac{g.(A-c)}{1+g} - \frac{\sum_{k=1}^{g} t_j^k}{1+g}.$$

The corresponding profit for the firm in country i selling in country j is:

$$(2) \qquad \pi_j^i = (q_j^i)^2 = [\frac{(A-c)}{1+g} + \frac{\sum_{k=1}^{g} t_j^k}{1+g} - t_j^i]^2.$$

The total profit that the representative firm makes is simply the sum of all the profits that it makes in all the g countries:

$$\Pi^i = \sum_{j=1}^{g} \pi_j^i = \sum_{j=1}^{g} [\frac{(A-c)}{1+g} + \frac{\sum_{k=1}^{g} t_j^k}{1+g} - t_j^i]^2.$$

National and World Welfare

Country i's welfare consists of the domestic consumer surplus (CS), the domestic firm's profits, and the tariff revenue (TR). Welfare is written as:

$$W_i = CS_i + \sum_{k=1}^{g} \pi_k^i + TR_i. \tag{3}$$

Assume that non-negative import tariff is the only available policy instrument, it can be computed that world welfare, which is the sum of all the national welfare ($W_{World} = \sum_i W_i$), is maximized under global free trade, that is when $t_j^i = 0$ for all countries.[7]

Political Economy

Even though global free trade is optimal in this model, it is not always necessarily the equilibrium outcome in the presence of political distortions and non-cooperative behavior by the countries. Modeling the formulation of trade policy is not a straightforward task. However, it is clear and widely accepted that producers are given extra weight and are playing a decisive role in shaping a country's policy stance.[8] This is a legitimate premise given that they are more easily organized than consumers. The policymaker's objective function is written:

$$V_i = aW_i + (1-a)\sum_{k=1}^{g} \pi_k^i, \; 0 \le a \le 1,$$

[7] It should be noted that due to oligopolistic distortions, global free trade is a second best policy. Unconstrained first best policy would include subsidies or negative tariffs.

[8] See e.g., Baldwin (1993), Cadot, de Melo and Olarreaga (1996), Panagariya and Findlay (1996), Krishna (1998). In an often quoted paper, Grossman and Helpman (1995) model the politics of FTAs by taking account of the influence exerted by organized groups.

where (1-a) is the relative weight that the policymaker assigns to the producers' profits. Due to their large number, consumers usually find it hard to effectively lobby for their desired policies. In this paper, I will rely on the assumption that the producers' profits play a decisive role in determining whether a country will form, join, or expand a RIA (i.e., $a = 0$). The gains and losses of domestic producers therefore drive trade policy decisions.[9] Simulations using different values of a reveal that relaxing this simplifying assumption does not affect the main qualitative results of the paper.

Common External Tariffs

Numerous authors (e.g., Krugman (1991), Panagariya and Findlay (1994), and Cadot, de Melo and Olarreaga (1996)) have argued that integrated countries have an incentive to raise their common external tariff. Bhagwati (1993) also argues that in models where producers play a decisive role, the formation and expansion of a RIA is likely to increase protection against non-members. In this paper, however, it is assumed that the levels of common *external* tariffs remain the same before and after the formation of a RIA. A simple interpretation of this is that the RIAs adhere to GATT's Article XXIV[10]. Accordingly, we write: $t_j^i = 0$ if $i = j$ or if both if i and j are members of the same regional arrangement; $t_j^i = t > 0$ otherwise.

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[9] This assumption has some supporting evidence. In a survey of the European pressure groups, Vaubel (1994) notes that only seven out of the 500 or so lobbies represent consumers or environmentalists. [Quoted in Cadot, de Melo and Olarreaga, 1996]

3. Asymmetric RIA Formation: Sequential Move

In this section, countries are assumed to move sequentially, one by one, in an exogenously given order. The objectives are (i) to look at the incentives of different countries to form, to join, or to expand a regional grouping and (ii) to determine the equilibrium group size for a given entry condition. Assume first that there are B trading blocs in the world. Denote h_b the size of the b-th bloc so that $\sum_{b=1}^{B} h_b = g$. If a country i does not belong to a RIA then $h_i =$ 1. Using equation (2), the profits earned by the firm of a representative country belonging to a representative bloc b in its own and its partners' markets are written as:

$$h_b.[\frac{A-c+(g-h_b).t}{1+g}]^2.$$

On the other hand, the profits that the firm earns in the non-partners' markets are:

$$\sum_{\substack{d=1 \\ d\neq b}}^{B}[h_d.[\frac{A-c-(h_d+1).t}{1+g}]^2].$$

Hence, the total profits that the representative firm, which are simply the sum of all the profits that it makes in all the g countries are:

$$\Pi(h_b) = h_b.[\frac{A-c+(g-h_b).t}{1+g}]^2 + \sum_{\substack{d=1 \\ d\neq b}}^{B}[h_d.[\frac{A-c-(h_d+1).t}{1+g}]^2]. \quad (4)$$

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[10] Fixing the external tariff greatly simplifies the analysis. It must be noted however that in practice Article XXIV has been notable for its weak enforcement. Moreover, there are many

The next proposition follows directly from the above equation.

Proposition 1. A firm belonging to a large RIA makes more profits than one belonging to a small RIA if the two RIAs coexist.

Proof. Suppose that p and q are two coexisting RIAs such that $h_p > h_q$ and $h_p + h_q < g$. Under valid parameter values, it can be computed that

$$\Pi(h_p) - \Pi(h_q) = (h_p - h_q).t.[2(A - c - (h_p + h_q).t) + (g - 1).t] > 0$$

A direct implication of *Proposition 1* is that a country would always apply for membership to the largest existing RIA. This, in turn, implies that starting from a situation where there exist no RIAs, if one RIA formed between two countries, all the remaining countries would want to join that RIA rather than form their own RIA. Hence, the first created RIA would expand as long as the insiders are willing to let more members in. In what follows, I study in some detail the expansion process of that RIA and the changes in the incentives of the insiders and the outsiders as the group size increases.

Assume now that h countries belong to that particular RIA, and thus have zero tariffs between them. The total profits of the firm in country i are simply the sum of all the profits that it makes in all the g countries. If the country is an insider, then the total profits are:

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protection instruments, such as antidumping, which are GATT consistent.

(5) $$\Pi^{i}_{in}(h) = h.(\frac{A-c+(g-h).t}{1+g})^2 + (g-h).(\frac{A-c-2t}{1+g})^2.$$

The first term on the right hand side (RHS) of (5) denotes the profit that firm *i* makes in the *h* member countries' markets (including its own). An increase in the club size has the first order effect of increasing the number of markets in which the firm receives preferential treatment and has cost advantage vis-à-vis the outsiders. Note, however, that as a second order effect, the squared quantity decreases as *h* increases. This reflects a "thinning-of-the-market": as the club size increases, the existing market is shared by more firms and oligopoly power for each firm declines. The second term is the profit that firm *i* makes in the (*g*-*h*) outsiders.

The next proposition follows:

Proposition 2. Multilateral free trade is initially feasible.

Proof. Starting from $h = 1$, a one-shot multilateral trade liberalization (reduction of t to zero) increases the profits of all the firms (for valid parameter values):

$$\Pi^{i}_{in}(h=1,t=0) - \Pi^{i}_{in}(h=1,t) = g.(\frac{A-c}{1+g})^2 - [h.(\frac{A-c+(g-h).t}{1+g})^2 + (g-h).(\frac{A-c-2t}{1+g})^2],$$
$$= \frac{(g-1).t.[2.(A-c)-(3+g).t]}{(1+g)^2} > 0.$$

□

One of the results of this model is that even though global free trade is feasible ex ante, it may become politically impossible once some group of countries have embarked on the regionalism path.

On the other hand, if country *i* is an outsider then its firm's profit is:

$$(6)\,\Pi^{i}_{out}(h) = \left(\frac{A-c+(g-1).t}{1+g}\right)^2 + h.\left(\frac{A-c-(h+1).t}{1+g}\right)^2 + (g-h-1).\left(\frac{A-c-2t}{1+g}\right)^2.$$

The first term on the RHS is the profit that the firm makes in its own market. The second term is the profits made in the *h* insiders. As *h* increases, the squared quantity decreases due to the increase in cost disadvantage vis-à-vis the insiders. The third term is the profits made in the (*g*-*h*-1) remaining outsiders.

Proposition 3. An increase in the RIA size unambiguously decreases the profits of the remaining outsiders.

Proof. It can be computed that for valid parameter values:

$$\frac{d\Pi^{i}_{out}(h)}{dh} = \frac{(A-c-(h+1)t)^2 - (A-c-2t)^2}{(1+g)^2} + \frac{-2.t.h(A-c-(h+1)t)}{(1+g)^2} < 0$$

This implies that even if the insiders strictly adhere to GATT's Article XXIV by not raising the level of their external tariffs the formation or the expansion of a club unambiguously hurt

the remaining outsiders. Hence, the current provision of the WTO regarding RIAs is not sufficient to protect outside producers from losses in profits.

Having computed the profits as functions of the club size, we can now study the incentives of both insiders and outsiders to form, join or expand an regional grouping.

With respect to the outsiders, the following proposition follows from *Proposition 1*.

Proposition 4. If the RIA has an open door or open membership policy, global free trade will be obtained[11].

Proof. Outsiders would want to join the club as long as $\Pi^i_{in}(h) - \Pi^i_{out}(h) \geq 0$ which is always the case. (See *Proposition 1*)

At the other end of the table, when contemplating whether to accept a new member or not, insiders look at the change in its total profit due to entry of the new member or,

$$\frac{d\Pi^i_{in}(h)}{dh} = \frac{(A-c+(g-h).t)^2 - (A-c-2t)^2}{(1+g)^2} - \frac{2th.(A-c+(g-h).t)}{(1+g)^2}.$$

[11] This type of result has led some economists (e.g., Yi (1996) and Snape (1992)) to recommend the addition of a clause to Article XXIV specifying that FTAs must let in any country that wants to join. Requiring such a liberal accession clause in free trade area and customs union agreements would ensure that these clubs within the GATT club would

As was already discussed, the effects of an increase in h on the insider's profits can be divided into two subeffects. The first term on the RHS denotes the gains from the increased size of the market in which the firm receives preferential treatment. The effective marginal cost of exporting to the new member has decreased. The second term reflects the "thinning" of the market. Basically, as h increases the pie becomes larger on the one hand but on the other hand more people share it.

Proposition 5. Under selective membership condition (i.e., the insiders can select whether or not to accept new members), global free trade will not be the outcome of the sequential bloc expansion process.

Proof. The simplest way to prove this result is to show that if only one group exists and if the group size is around g (i.e., global free trade), an expansion of the RIA will decrease insider's profits:

$$\left.\frac{d\Pi_{in}^{i}(h)}{dh}\right|_{h=g} = \frac{(A-c)^2-(A-c-2t)^2-2.t.g.(A-c)}{(1+g)^2}$$

$$= \frac{-4t^2-(2g-4)(A-c)t}{(1+g)^2} < 0$$

□

In the case where only one bloc was allowed to exist, the insider's preferred group size will be the club size, denoted h^*, at which,

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further, rather than threaten, the aims of GATT itself. Many economists (e.g., Srinivasan

$$\frac{d\Pi^{i}_{in}(h)}{dh} = 0.$$

It can be computed that:

$$h^{*} = \frac{2.(A - c + gt) - \sqrt{(A - c + gt)^{2} + 3(A - c - 2t)^{2}}}{3t}.$$

If the outsiders did not have the option of forming a second bloc (i.e., only one bloc was allowed to form), no more new entry will be accepted beyond this point and h^{*} will be the resulting bloc size. For illustrative purpose, the model is simulated using specific parameter values. Four cases (with 30 countries) are depicted in Figure 1. The figure confirms the result that outsiders will be hurt by the expansion of a RIA. It also shows that the profits of the insiders initially increase with the enlargement of the RIA, but when the group size reaches about half of the world (around 15 or 16 out of 30 countries), profits begin to decline with any further expansion. This result is robust to reasonable changes in the parameters of the model.

The rejected outsiders, instead of being passive, will gain from forming a countervailing RIA. As this second RIA expands, those that are left out of it will become worse off and will apply for membership. At the same time, the enlargement of the second RIA will hurt the members of the first one. However the members will not have the incentive to drop out of their RIA and seek membership to the second RIA since they already belong to the larger RIA. Instead,

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(1996), Lawrence (1996) have questioned the practicality of such suggestion.

in some instances, they may find it in their interest to expand their RIA further, preempting the creation and the expansion of the second bloc. In a Stackelberg fashion, they will try to influence the potential size of countervailing RIA by further increasing the size of theirs. In doing so, they will consider, on the one hand, the profit losses that they would experience if their RIA grew beyond h^* and, on the other hand, those that they would incur if the second RIA expanded. If the latter losses are larger, then, the members of the first bloc will be better of expanding their own bloc rather than letting the expansion of the second one. Formally, let h_1 and h_2 be the size of respectively the first and the second bloc. The threat of creation and enlargement of the second RIA will lead to the expansion of the first one as long as:

$$\Pi_{h_1}(h_1+1,h_2) \geq \Pi_{h_1}(h_1,h_2+1), \tag{7}$$

where Π_{h_1} denotes the total profits of a member of the first bloc. When (7) holds with equality, the members of the original RIA would be indifferent between accepting new members and allowing the second RIA to expand.

Due to segmented market assumption, the second group's preferred size is also h^* for any given size of the original bloc. To see this, consider the profit of a representative member of a group of size h_2 when a first group of size $\bar{h}_1$ already exists:

$$\Pi_{h_2}(\bar{h}_1,h_2) = \bar{h}_1.[\frac{A-c-(\bar{h}_1+1).t}{1+g}]^2 + h_2.[\frac{A-c+(g-h_2).t}{1+g}]^2 + (g-\bar{h}_1-h_2).[\frac{A-c+2.t}{1+g}]^2$$

This is maximized when $h_2 = h^*$. Note however that the size of the second bloc can be constrained the fact that there are only g countries in the world, so that $(g- h_1) \geq h_2$. Accordingly, the size of the countervailing RIA is given by:

$$h_2 = \text{Min}\,[h^*, (g - h_1)].^{12}$$

Anticipating this, the original RIA (which could be thought of as the Stackelberg leader) can gain by acting strategically and will keep expanding as long as:

$$\Pi_{h_1}(h_1 + 1, g - (h_1 + 1)) \geq \Pi_{h_1}(h_1, g - h_1).$$

Intuitively, this means that the first (or "leader") RIA will expand if the profit gains obtained by decreasing the size of the second (or "follower") bloc offset the profit losses associated with enlargement. Appendix 1 shows this intuition graphically. The resulting sub-game perfect equilibrium sizes of the two blocs would respectively be:

$$h_1 = \frac{2(A-c)(-1+3g) - (-1+g.(3+2g)).t}{2(4(A-c) - (2+g).t)} \text{ and,}$$

$$h_2 = \frac{(1+g)(2(A-c) - t)}{2(4(A-c) - (2+g).t)}.$$

It can be shown that h_1 is larger than h_2 for valid parameter values. For some given parameter values of A, g and c, the size of each RIA (i.e., h_1 and h_2) is reported in the following table for different tariff levels.

[12] Recall that the simulations reported in Figure 1 indicate that h^* is about half of the world, which implies that in this model at most two blocs will be created.

Table 1: Sub-game Prefect RIA Sizes

$A = 300, g = 30, c = 10$

Specific Tariff (t)*	First RIA (h_1)	Second RIA (h_2)
1 (5.0%-5.3%)	22	8
2 (9.7%-10.6%)	22	8
3 (13.9%-15.9%)	21	9
4 (17.8%-21-2%)	21	9
5 (21.4%-26.6%)	21	9
6 (24.7%-31.9%)	20	10
7 (27.8%-37.2%)	20	10
8 (30.6%-42.5%)	20	10
9 (33.3%-47.9%)	19	11

*The range of the corresponding ad-valorem tariffs (t/P) are in parentheses.

The above table shows that the original RIA would end up with approximately two-thirds of the world while the second one with one-third. The anticipation of the enlargement of a second RIA has led the members of the first group to choose a group size larger than what they would have chosen if only one bloc was allowed to form or if they did not act strategically (which is half of the world). Thus, the threat of regionalism will lead to a larger RIA. For instance, the threat of a large East Asian trading bloc (e.g., East Asian Economic Caucus (EAEC) might have conceivably led to the talks about the enlargement of both NAFTA and the European Community.

Another result, which can also be shown analytically, is that the size of first RIA decreases with the general tariff level. This comes from the fact that in a protectionist environment, giving up one's protected preferential markets by expanding the RIA size will cost more than allowing another bloc to expand since access to that bloc was already restricted anyway.

4. Symmetric RIA Formation and Expansion: Simultaneous Move

In the previous section, I showed that the profits of the countries that are left out of the RIA unambiguously decline as the group size increases. It was assumed that countries moved sequentially, one at a time and that they will not start a new RIA until they are rejected from an existing one. More realistically, however, countries sometimes move simultaneously and countries can, instead of applying for membership to an existing RIA, form their own.

In fact, real world experience suggests that negotiations about integration between a group of countries can prompt other countries to form a group of their own and blocs are created simultaneously. For instance, the creation of the European Free Trade Association (EFTA) was a response to the creation of the European Economic Community (EEC). It can also be said that Mercosur was established with a desire to balance NAFTA. These blocs may then have incentives to merge with each other as is exemplified by the talk about the FTAA.

This section allows for the possibility that countries are moving simultaneously and not sequentially as in the previous section. The goal is to determine (i) the equilibrium number of RIAs and (ii) the equilibrium size of each group. For simplicity, I assume that there are $g = 2^Z$ $(Z \in \mathrm{N})$ identical countries in the world. As in the previous section, there is only one firm producing in each country and trade policy formulation is determined by the profits of that firm.

RIA formation and further expansions take place in many (but less than Z) stages described as follows. In the first stage (Stage 1), each of the g countries forms a RIA with one and only one neighbor. This results in $g/2$ RIAs with two countries in each. In the second stage (Stage 2), each of the $g/2$ RIAs merges with one and only one neighboring RIA. This yields $g/4$ RIAs with four countries in each and so on. In the n^{th} stage (Stage n, $n < Z$), each of the $g/2^{n-1}$ RIAs decides on whether or not to form a RIA with one neighboring RIA. Due to the assumed symmetry of the model, the decisions will always be unanimous among the members and reciprocal among the RIAs. If merger is accepted, it results in $g/2^n$ RIAs with 2^n countries in each. The evolution of the integration process is shown in Table 2. [13]

Table 2. Evolution of Integration Process

Possible Stage	RIA Number	RIA Size
0	$g/2^0$	1
1	$g/2$	2
2	$g/4$	4
3	$g/8$	8
(...)	(...)	(...)
N	$g/2^n$	2^n
(...)	(...)	(...)
Z-1	2	2^{Z-1}
Z	1	$g = 2^Z$

[13] Bond and Syropoulos (1996) model symmetric bloc expansion (or increase in "absolute bloc size") in a more abstract way. They exogenously divide the world into B identical blocs with each bloc consisting of $n = g/B$ countries. Then, they consider the effects of a decrease in the number of blocs B. Implicitly, a decrease in the number of blocs—say from B to (B-1)—implies that all B blocs are first dissolved, and then the countries recombine to form B-1 blocs of $g/(B\text{-}1)$. The approach in the present paper is simpler and conceptually more realistic.

The RIAs will keep on merging (i.e., moving to the next stage) as long as their members find it worthwhile to do so. My goal is to determine whether or not the mergers will go on until Stage Z after which there is only one RIA with g members left. If not, at which Stage n^* will the mergers stop? The answer to this question simultaneously gives us the equilibrium number of RIAs and the equilibrium size of each one of them. Since, in this framework, all the countries are identical and their membership situations are all the same, we only need to study the incentives of one single representative country.

In analogy to the previous section where I used the terms *insiders* and *outsider*, I shall use in this section the terms *partners* and *non-partners*. Using (2), the profits that the firm of the representative country makes at any Stage n is written as:

$$(8) \qquad \Pi(\text{Stage } n) = 2^n\left(\frac{A-c+(g-2^n)}{1+g}\right)+(g-2^n)\left(\frac{A-c-(2^n+1)}{1+g}\right).$$

The first term in the right hand side of (8) denotes the profits made in the 2^n *partner* countries while the second term denote the profits made in the $(g - 2^n)$ *non-partner* countries. The country's firm will support RIA merger if and only if an increase in n does not decrease its profits. For convenience, denote the number of partners as $N = 2^n$. Since N is monotonically increasing in n, RIAs will keep on merging as long as:

$$\frac{d\Pi}{dN} = \frac{(A-c+(g-N)t)^2}{(1+g)^2} + \frac{-2tN(A-c+(g-N)t)}{(1+g)^2} + \frac{-(A-c-(1+N)t)^2}{(1+g)^2} + \frac{-2t(g-N)(A-c-(1+N)t)}{(1+g)^2} > 0. \quad (9)$$

The effects of a merger can be decomposed into four effects. The first terms on the RHS of (9) is the increase in profits due to the increased number of partners while the second one is the decline in the profits made in each of the partner countries. A merger has the first order effect of increasing the number of markets in which the firm receives preferential treatment and has cost advantage vis-à-vis the non-partners. However, as a second order effect, there is a "thinning-of-the-market" in each of the partner markets: as the club size increases, the existing market is shared by more firms and oligopoly power for each firm declines. As I stated in the previous section, the pie is becoming larger but it is also shared by more firms. The third term on the right hand side reflects the decrease in the number of non-partners. Finally, the fourth expression denotes another "thinning-of-the-market" as the profits that the firm makes in each of the non-partners declines.

At early stages of the integration process (i.e., RIA size N is small), it can be seen from (9) that the positive effect of a merger dominates the negative ones. That is, the formation and the mergers of the RIA are beneficial to the firms. At later Stages, however, the negative effects become more important and further mergers may end up hurting the firms. In fact, it can be computed that $\frac{d^2\Pi}{dN^2} = -\frac{2t(2+g)}{(1+g)^2}$ which is unambiguously negative.

The model is simulated in order to determine the equilibrium number and size of the symmetric RIAs for some given parameter values. The representative firm's profits, which play the decisive role in this model, is graphed against the Stage number. We have $32 = 2^5$ countries in the world which means that integration can take place in five possible stages. In Stage 1, each of the 32 countries forms an RIA with another country which results in 16 RIAs with two countries in each. In Stage 2, each of the 16 RIAs merges with another RIA which yields 8 RIAs with four countries in each and so on. In Stage 5, the two RIAs with 16 members in each merge. The integration process will go as long as the RIA merger increases the profits of the representative firm.

Four cases are shown in Figure 2. Note first that in all the cases, global free trade (which results from Stage 5) always dominates the initial status quo in terms of the representative firm's profits. This means that if the countries choose multilateral liberalization instead of embarking on the regional integration process, then global free trade is politically feasible. It turns out, however, that taking the regionalism path can make initially feasible multilateral free trade politically unfeasible.

In one of the four cases, in which the tariff is very low ($t = 1$)[14], the integration process goes all the way to Stage 5 to yield global free trade. Rigorously, the integration process will yield one super-RIA to which all the world's country belong if, and only if,

$$t < \frac{4(A-c)}{g^2+2g+2}.$$

This result has an interesting implication: If the regional integration path is undertaken alongside or after the multilateral one so that the general level of MFN (or, in this case, inter-bloc) tariffs worldwide is low enough (not necessarily zero), then the RIAs will keep on merging until all countries belong a single RIA. Hence, if the global trading system is liberal enough before the regional integration process, then the integration process described in this section leads to global free trade. We have here an example of "open regionalism" based on low external tariffs leading to global free trade.

In the other three cases presented in Figure 2 (in fact for any $t > 1.06$), global free trade does not appear: the integration process stops at Stage 4. This means that if the intra-bloc tariffs were not low enough, the equilibrium outcome would be two RIA with half of the world (16 countries in these cases) in each.

[14] Recall that this is "specific tariff." In this series of simulations, price level ranges between 19 and 27 and the ad-valorem tariff corresponding to $t = 1$ would be around 5%.

5. Concluding Remarks

This paper presents a simple model of RIA formation and expansion using an oligopolistic competition framework. At the outset, I note that in this model the *world welfare* is maximized under global free trade. The political economy framework used in this paper is one where producers play a decisive role in formulating trade policy. Hence, the analysis is mainly based on the producers' profits. I look at two different types of endogenous RIA expansion: one sequential (or asymmetric) and one simultaneous (symmetric). In both types, I show that bloc expansion is likely to stop before it reaches global free trade.

I first look at the asymmetric type where only one RIA forms and expands at any given time. I find, on the one hand, that an expansion of a regional grouping always, and unambiguously, hurts the producers in countries that are left out even if the insiders do not change their external tariffs of the RIA as a result of integration. On the other hand, the effects of a club expansion on an insider's profits are positive for small club size but become negative, as the club becomes large. This is consistent with the "club theory" characteristics of an RIA in that congestion and crowding tend to occur as the number of members increases.

I also find that the equilibrium group size depends on the entry condition of the RIA. The club size will grow until it contains all the existing countries under "open membership" condition. This supports the arguments that under open regionalism, RIAs are *stepping stones* towards global free trade. However, when membership is selective, the expansion of a RIA

fails to lead to global free trade: RIAs are *stumbling blocks* under "selective-entry" regionalism. Before its size reaches global free trade, the member of the bloc would stop accepting new members, which leads to the creation of a second bloc. In this case, the RIA structure would be two blocs with the first one containing about two-thirds of the world and the second one third. An interesting result in this section is that in anticipation of the creation of the second bloc, the forward looking members of the first bloc choose a larger bloc size than that which they would have chosen if only one bloc was allowed to form, or if they were not forward looking.

Next, I look at the symmetric type of integration process where more than one RIA form. In this case, a number of RIAs form symmetrically and keep on merging as long as the producers in each country find merger to be profitable. At early stages of the integration process, a merger benefits producers as the size of the market in which they receive preferential treatment increase. At later stages, however, mergers may end up hurting the firms as more and more firms share the preferential accesses. I find that, although global free trade is always politically feasible in a one-shot multilateral liberalization, it may become unfeasible when the regional integration path is taken. Under most circumstances, the world trading system will be stuck with two large symmetric RIAs as firms will resist any further merger. It should be noted that if the incidence of MFN or intra-bloc tariffs is low enough, then the blocs will keep on merging until global free trade is obtained. Thus, here we have an example of open regionalism, based on low external tariffs, leading to multilateral free trade.

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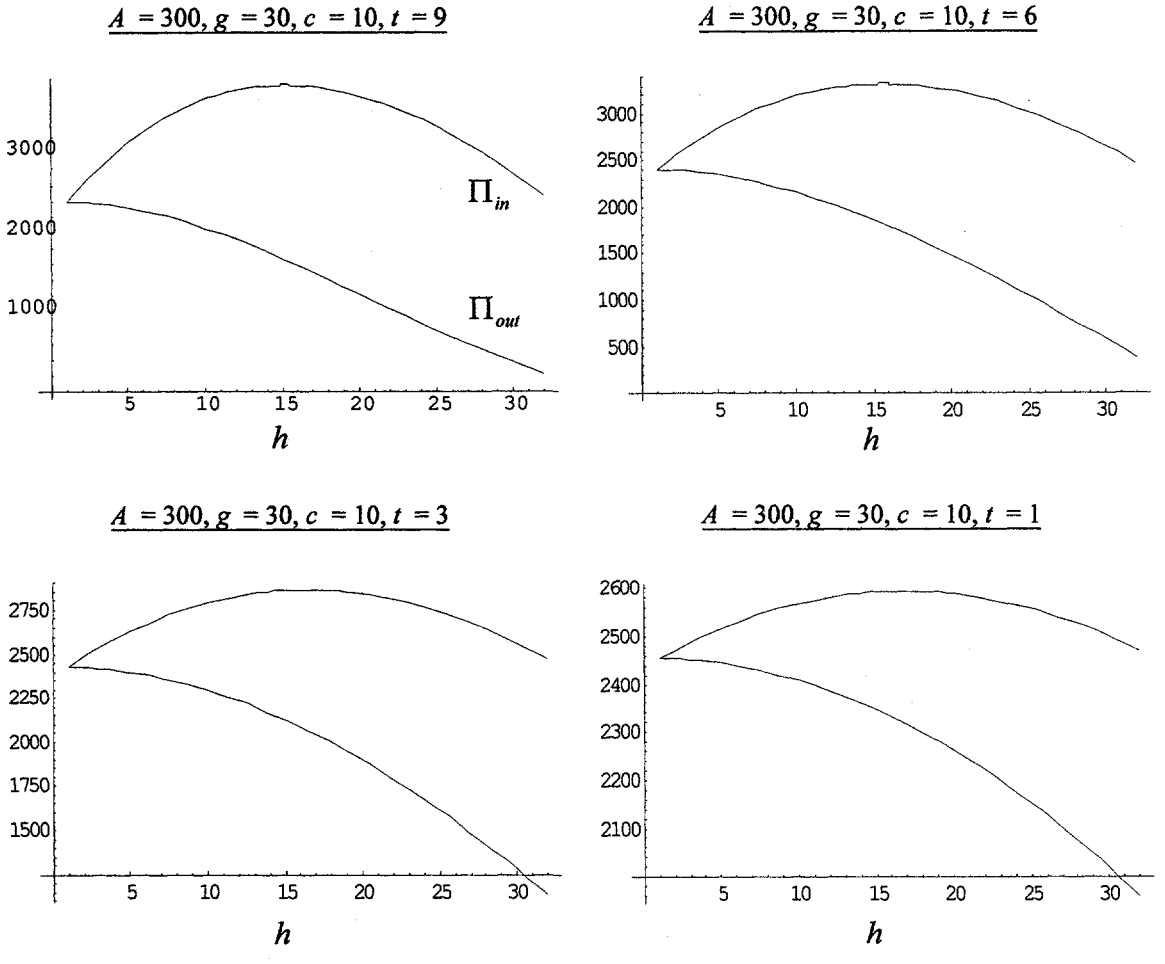
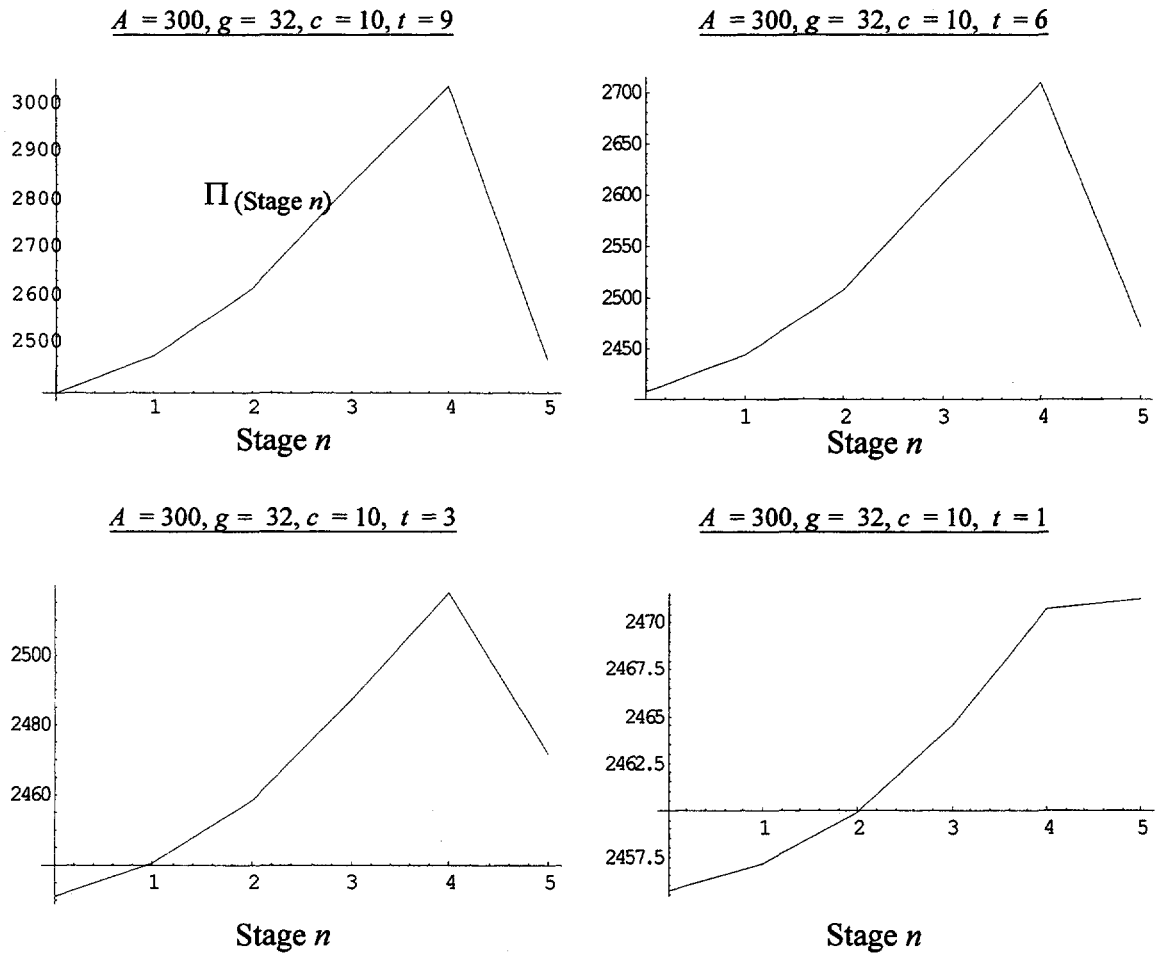
Figure 1: Firms' Profits in Asymmetric RIA Expansion



Note: The corresponding ad-valorem tariffs vary according to the group size but are ranging from 5% to 5.3% for $t = 1$; from 13.9% to 15.9% for $t = 3$; from 24.7% to 31.9% for $t = 6$; and from 33.3% to 47.9% for $t = 9$.

Figure 2: Representative Firm's Profits in Symmetric RIA Expansion



Note: The corresponding ad-valorem tariffs vary according to the group size but are ranging from 5% to 5.3% for $t = 1$; from 13.9% to 15.9% for $t = 3$; from 24.7% to 31.9% for $t = 6$; and from 33.3% to 47.9% for $t = 9$.

Appendix 1. Stackelberg Game with Original Bloc as Leader.

Figure A1. Reaction Functions and Indifference Curves

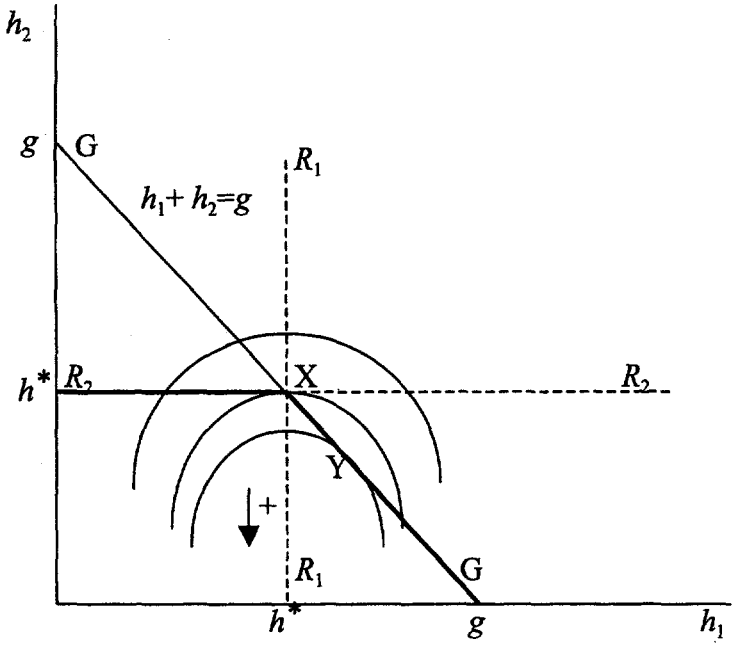


Figure A1 shows how the members of the first RIA can gain by acting as a Stackelberg leader. It plots a series of indifference curves for the first bloc, in which a southward movement means increased profits. The "unconstrained reaction functions" of the each bloc with respect to the size of the other are also shown (R_1R_1 and R_2R_2). Note first that if there was no constraint on the total number of countries (g), or if the first bloc did not behave strategically, then the equilibrium RIA structure would be point X (i.e., each bloc chooses h^*). However, given the constraint on the size of the second bloc ($(g- h_1) \geq h_2$), the effective reaction function of the second bloc becomes kinked at $g/2$ and is represented by R_2XG. It can clearly be seen that, the Stackelberg leader can be better off by choosing point Y rather than point X. By increasing its size beyond its preferred level, the first bloc can gain by effectively decreasing the size of the second bloc. Hence, in the subgame perfect equilibrium h_1 will be bigger that h^*.

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